UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

NOW THE
OFFICE OF LAND AND
EMERGENCY MANAGEMENT

JUN 02 2017

Richard Poeton
1 Monument Avenue
Bennington, VT 05201

Dear Mr. Poeton:

Thank you for your April 7, 2017, letter to U.S. Environmental Protection Agency (EPA) Administrator Scott Pruitt regarding the Superfund program's radiation policies. I am responding to your letter on behalf of the Administrator.

Your letter's primary point is that EPA should revise its Superfund radiation policies such that they rely upon "the established framework and capabilities of the Air and Radiation Office" rather than a Superfund-specific framework. The Superfund program's radiation policies reflect the program's statutory (Comprehensive Environmental Response, Compensation and Liability Act [CERCLA]) and regulatory (National Oil and Hazardous Substances Pollution National Contingency Plan [NCP]) provisions, which require Superfund cleanups to appropriately protect human health and the environment from all contaminants while accounting for the differences between radionuclides and chemicals. For this reason, the Superfund approach for addressing radionuclides is not identical to that of other EPA programs (e.g., the Office of Indoor Air and Radiation [ORIA]) nor to that of other federal agencies (e.g., the Nuclear Regulatory Commission [NRC]), which utilize other statutes, such as the Atomic Energy Act. EPA developed Superfund-specific guidance to help ensure that Superfund radiation cleanups are conducted in a fashion consistent with CERCLA and the NCP.

In addition to the specific statutory and regulatory framework governing Superfund radiation policies, the 1999 National Academy of Science (NAS) report, *Evaluation of Guidelines for Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials* explains, for example, that differences between EPA and NRC in determining acceptable risk from radionuclides is a matter of judgment (risk management policy) and not science. In addition, while the Superfund approach for addressing radiation is not identical to that in ORIA, the programs share a scientific basis for conducting work to protect against radiation hazards. Finally, the models EPA issued for risk and dose assessment are based on sound science and both internal and external reviews.

Various national and international stakeholders are addressing radiation risk. EPA has a robust working relationship with many of them including the NRC, the Department of Energy, the Interstate Technology Regulatory Council, and foreign and international agencies. EPA works cooperatively with these entities to advance radiation protection while recognizing the parties' unique scope and authorities.

Finally, the National Council on Radiation Protection and Measurements' analysis of EPA's and NRC's current regulatory guidance and practice for radioactively contaminated site remediation concluded that both organizations' practices can protect public health with site-specific cleanup levels.

Thank you again for your letter. An attached staff report provides additional detailed information. Please contact Stuart Walker, the Office of Superfund Remediation and Technology Innovation radiation expert at walker.stuart@epa.gov or 703-603-8748 if you have additional questions.

Sincerely,

James E. Woolford
Director
Office of Superfund Remediation and
Technology Innovation

Enclosure

Additional Information

(prepared by EPA staff)

Statutory and Regulatory Language Specifying Protectiveness

CERCLA remedial actions have to meet the statute's definition of protective. (See NCP 300.430 - # 1 remedy selection criteria and required in CERCLA Section 121). As discussed in the NCP, the agency made a policy choice to follow the 10^{-4} to 10^{-6} risk range to define CERCLA's protectiveness for carcinogens.

Please note that the Office of Land and Emergency Management's (OLEM, formerly the Office of Solid Waste and Emergency Response) policy for the remedial program, which states that the cancer risk range determines protectiveness for radionuclides and that dose limits above the risk range are not protective, is consistent with how other EPA offices have viewed radionuclides across a variety of statutes and situations. We have attached a pdf file "EPA statements on high dose limits" which provides a sampling of these EPA views.

Below are statutory and regulatory excerpts (Section 121 of CERCLA and 300.430 of the NCP) that state remedial actions must be protective of human health and that, in the case of carcinogens, this means attaining the 10^{-4} to 10^{-6} cancer risk range.

SEC. 121. CLEANUP STANDARDS.[1]

(a) SELECTION OF REMEDIAL ACTION.—The President shall select appropriate remedial actions determined to be necessary to be

The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. If the President selects a remedial action not appropriate for a preference under this subsection, the President shall publish an explanation as to why a remedial action involving such reductions was not selected.

(d) DEGREE OF CLEANUP.—(1) Remedial actions selected under this section or otherwise required or agreed to by the President

under this Act shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment. Such remedial actions shall be relevant and appropriate under the circumstances presented by the release or threatened release of such substance, pollutant, or contaminant.

§ 300.430 Remedial investigation/ feasibility study and selection of remedy.

(a) *General*—(1) *Introduction.* The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment. Remedial actions

(2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of

(i) The criteria noted in paragraph (e)(9)(iii) of this section are used to select a remedy. These criteria are categorized into three groups.

(A) *Threshold criteria.* Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection.

(B) *Primary balancing criteria.* The

Role of U.S. Environmental Protection Agency Guidance

EPA's guidance documents neither impose mandatory standards nor represent "rulemaking by policy." Their purpose is to provide guidance and direction to EPA activities. The Office of Management and Budget (OMB) reinforced the role of guidance documents in the context of EPA's CERCLA cleanup levels for radioactive contamination in 1997 when responding to a query from U.S. Senators Frank Murkowski, Pete Domenici and Don Nickles regarding EPA's 1997 directive, "Establishment of

Cleanup Levels for CERCLA Sites with Radioactive Contamination." Excerpts from the Senators' November 21, 1997, letter and OMB's November 21, 1997, response (provided by Sally Katzen, who was OMB's Administrator of the Office of Information and Regulatory Affairs at the time of the correspondence) follow:

Below is a quote from the incoming letter signed by three Senators.

> In what appears to be a substitute for the formal rulemaking, EPA has recently issued guidance for its Superfund Program indicating that standards such as that promulgated by NRC may not be sufficient for use at remediation sites, and more stringent Preliminary Remediation Goals should be used (OSWER No. 9200.4-23). As you can imagine, this guidance could significantly increase cleanup costs at sites managed by the Department of Energy, and may profoundly affect budget requirements for the Federal government and, ultimately, the taxpayer.
>
> This guidance would appear to come under the definition of a rule, as that term is broadly defined and understood under the Administrative Procedures Act (5 U.S.C. 551). Thus, it fits the definition of a rule as that term is also defined in the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). That statute placed certain requirements on Federal agencies for notification to Congress when rules were promulgated. Knowing that there has been no Congressional notification.

Below is a quote from the OMB response letter.

> the agency promulgating the regulation. On receiving your letter, I asked my staff to ascertain whether EPA had determined that the guidance in question is or is not a *rule* as defined in the Congressional Review statute. I have been advised that EPA does not consider the guidance to be a rule because it does not have the force and effect of law, but simply provides advice to the EPA Regions. Indeed, EPA states that the guidance is not a legally binding document; its use can be challenged at each individual site and once challenged, the guidance has no standing and will be set aside in favor of the merits of the particular case.
>
> Because EPA states that this guidance does not have the force and effect of law and is not a rulemaking, the circulation of this document is consistent with the provisions of Executive Order No. 12866. If you have further questions, please do not hesitate to contact me.

National Academy of Scientists Assessment of Superfund's Risk-Based Approach

In its 1999 report, *Evaluation of Guidelines for Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials*, NAS made the following statements:

> This committee offers the following comments on the issue of a limit on acceptable risk and, therefore, acceptable dose. First, the determination of an acceptable risk for any exposure situation clearly is entirely a matter of judgment (risk-management policy) which presumably reflects societal values. Inasmuch as EPA and the Nuclear Regulatory Commission have used essentially the same assumptions about the risks posed by radiation exposure in establishing radiation standards, it is clear that the determination of a limit on acceptable dose for any exposure situation also is entirely a matter of judgment. Therefore, any differences between the views of EPA and the Nuclear Regulatory Commission on an acceptable dose have no scientific or technical basis.

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Differences Between Environmental Protection Agency and Nuclear Regulatory Commission Approaches to Risk Assessment

> The Nuclear Regulatory Commission's approach to estimating risk posed by chronic radiation exposure of the public normally is based on ICRP recommendations on estimating doses per unit exposure and the risk per unit dose. The Nuclear Regulatory Commission estimates lifetime risks on the basis of estimates of annual doses that are the sum of the annual dose equivalent to the whole body from external exposure and the 50-y committed effective dose equivalent (ICRP 1977) from ingestion and inhalation of radionuclides. Lifetime risk is estimated by multiplying the annual effective dose equivalent from external and internal exposure by the assumed exposure time (for example, 70 y) and the nominal risk of fatal cancers caused by uniform whole-body irradiation of 5×10^{-2} per sievert (ICRP 1991). It is important to note that ICRP's nominal risk factor takes into account the age dependence of radiation risk in the whole population, which is based on data on the atomic-bomb survivors (ICRP 1991).
>
> EPA has developed a methodologically more rigorous approach to assessing risk posed by chronic lifetime exposure to radionuclides, which is particularly important for internal exposure and differs in several respects from the simple approach described above.

On page 225

Comments On Differences Between Environmental Protection Agency and Nuclear Regulatory Commission Approaches to Risk Assessment

This committee offers the following comments on EPA's approach to risk assessment for chronic lifetime exposure of the public, especially internal exposure, as it differs from the approach normally used by the Nuclear Regulatory Commission for similar exposure situations.

First, EPA's approach should provide more realistic estimates of risk than the approach used by the Nuclear Regulatory Commission. All the factors described in the previous section—the use of organ-specific risks for many organs instead of risks based on the effective dose equivalent and a nominal risk from uniform whole-body irradiation, the use of updated biokinetic models in estimating dose from ingrowth of decay products in the body, the use of organ-specific RBEs for alpha particles, and the use of age-specific dose rates from internal exposure in conjunction with age-specific cancer risks—should result in more realistic estimates of risks associated with chronic lifetime exposure.

Oak Ridge National Laboratory Involvement in the U.S. Environmental Protection Agency's Superfund Approach to Estimating Radiation Risks

EPA's Office of Superfund Remediation and Technology Innovation (OSRTI) has an interagency agreement with the Department of Energy's Oak Ridge National Laboratory (ORNL) to develop the Superfund preliminary remediation goals (PRGs) and dose compliance concentration (DCC) calculators for CERCLA assessments, as well as risk and dose assessment tools, including developing geometrically challenging exposure factors. The Center for Radiation Protection Knowledge, which is part of ORNL's Environmental Sciences Division, manages this work. K. Z. Morgan, director of ORNL's Health Physics Division and an early recipient of the Swedish Royal Academy Gold Medal for Radiation Protection, started the ORNL Dosimetry Research Program in the 1950s. Since 1979, Keith Eckerman, recipient of the most recent (12th) Swedish Royal Academy Gold Medal, has led this program.

Since its inception, the ORNL Dosimetry Research Program has provided the national and international scientific communities with models and data required to estimate doses and risks from exposure to radionuclides and establish exposure guidelines for radionuclides. To learn more about CRPK and its relationship to the Dosimetry Research Program, you may go to this website: https://www.ornl.gov/crpk .

Below are some of the ORNL technical manuals specifically developed for the Superfund six PRG and DCC calculators:

Area Correction Factors for Contaminated Soil for Use in Risk and Dose Assessment Model.
https://epa-prgs.ornl.gov/radionuclides/ACF_FINAL.pdf

Gamma Shielding Factors for Soil Covered Contamination for Use in Risk and Dose Assessment Models
https://epa-prgs.ornl.gov/radionuclides/GSF_FINAL.pdf

Biota Modeling in EPA's Preliminary Remediation Goal and Dose Compliance Concentration Calculators for Use in EPA Superfund Risk Assessment: Explanation of Intake Rate Derivation, Transfer Factor Compilation, and Mass Loading Factor Sources
https://epa-prgs.ornl.gov/radionuclides/20161130_Biota_TM_KLM_Final_printable_version.pdf

Dose Rates in Contaminated Rooms of Various Sizes
https://epa-bprg.ornl.gov/documents/Contaminated_Room_Dose_Rate_03_01_07.pdf

External Scientific Reviews of the Office of Land and Emergency Management's Risk and Dose Assessment Tools

EPA's models for risk and dose assessment have undergone a series of external reviews, in addition to EPA internal reviews. EPA used guidance descriptions for each of these types of external review categories, one of which can be found in the EPA document "Guidance on the Development, Evaluation, and Application of Environmental Models."

We have listed out each review EPA conducted of the six PRG and DCC calculators, which the Superfund program developed for risk and dose assessment, and have placed them into categories as described in the EPA document.

EPA Guidance Description of Model Review Categories

Peer Review

Page 23 provides a description of the purpose of "peer review":

Peer review provides the main mechanism for independent evaluation and review of environmental models used by the Agency. Peer review provides an independent, expert review of the evaluation in Section 4.1; therefore, its purpose is two-fold:

- To evaluate whether the assumptions, methods, and conclusions derived from environmental models are based on sound scientific principles.
- To check the scientific appropnateness of a model for informing a specific regulatory decision. (The latter objective is particularly important for secondary applications of existing models.)

Page 23 provides further description on documenting charge questions to peer reviewers:

Peer review charge questions and corresponding records for peer reviewers to answer those questions should be incorporated into the quality assurance project plan, developed during assessment planning

Page 25 discusses possible mechanisms for conducting a peer review:

results to decision making. Mechanisms for accomplishing external peer review include (but are not limited to):

- Using an ad hoc panel of scientists.[3]
- Using an established external peer review mechanism such as the SAB
- Holding a technical workshop.[4]

When conducting an "independent external" scientific peer review of the three PRG calculators model or document, OSRTI has used a peer review contractor to conduct the peer review process (e.g., select the peer reviewers, provide charge questions, summarize the peer review comments in a chart). OSRTI staff may provide comments on potential peer reviewers and charge questions. Later, OSRTI, with ORNL support, has developed responses to the peer review comments. EPA has made all of this material available online.

OSRTI has also had more focused external "not independent" external peer reviews on early drafts of various PRG/DCC calculators. OSRTI requested and received review by the Army Corps of Engineers Center for Excellence under an interagency agreement. EPA has also made this material available online.

We have made distinction between these two types of external peer reviews (independent and not independent) in the email below.

The guidance also discusses how there may be internal peer review or other types of internal comments (e.g., workgroups). Each of the PRG/DCC calculators went through multiple rounds of internal EPA review but due to the form of these comments, which EPA does not make publically available, they are not discussed further.

Verification

Page 42 and 48 provides EPA definition of "verification":

Code verification: Examination of the algorithms and numerical technique in the computer code to ascertain that they truly represent the conceptual model and that there are no inherent numerical problems with obtaining a solution (Beck et al. 1994).

Verification (code): Examination of the algorithms and numerical technique in the computer code to ascertain that they truly represent the conceptual model and that there are no inherent numerical problems with obtaining a solution (Beck et al 1994).

Page 14 discusses that an independent verification may be useful. EPA guidance makes a distinction between multiple code verification by code developers and a potential independent testing of code, which is why the EPA's PRG/DCC websites make a distinction between internal and external verification.

Model coding translates the mathematical equations that constitute the model framework into functioning computer code. Code verification ascertains that the computer code has no inherent numerical problems with obtaining a solution. Code verification tests whether the code performs according to its design specifications. It should include an examination of the numerical technique in the computer code for consistency with the conceptual model and governing equations (Beck et al. 1994). Independent testing of the code once it is fully developed can be useful as an additional check of integrity and quality.

Benchmark

Page 34 provides a list of model evaluation methods discussed in an NAS document providing a description of benchmark analysis.

Benchmarking against other models. Comparison of model results with other similar models.

U.S. Environmental Protection Agency and U.S. Department of Energy Reviews by Categories

Peer Review

EPA Independent External Peer Reviews

PRG calculator (material listed for the October 30, 2014 to January 15, 2015 review)
https://epa-prgs.ornl.gov/radionuclides/prg_peer_review.html
BPRG (material listed for the April to June, 2006 review)
https://epa-bprg.ornl.gov/bprg_peer_review.html
SPRG (material listed for the January 16 to February 27, 2008 review)
https://epa-sprg.ornl.gov/sprg_peer_review.html

EPA External Peer Reviews (not independent)

PRG (material listed for July 29, 2004 review)
https://epa-prgs.ornl.gov/radionuclides/prg_peer_review.html
BPRG (material listed for November 2, 2004 review and June 1, 2004 review)
https://epa-bprg.ornl.gov/bprg_peer_review.html
SPRG (material listed for September 20, 2007 review and July 25, 2007 review)
https://epa-sprg.ornl.gov/sprg_peer_review.html
BDCC (material listed for April 17, 2008 review and February 20, 2008 review)
https://epa-bdcc.ornl.gov/bdcc_peer_review.html

Verification

EPA Independent External Verification Reviews

PRG calculator (April 24, 2015 to September 30, 2015)
https://epa-prgs.ornl.gov/radionuclides/PRGReviewCompletePackage_Sept2015.pdf
BPRG (October 16, 2015 – December 22, 2015)
https://epa-bprg.ornl.gov/documents/BPRGExternalVerificationStudyAll.pdf
BDCC (March 17, 2016 - May 31, 2016)
https://epa-bdcc.ornl.gov/BDCCExternalVerificationStudyAll.pdf

Benchmark

EPA Benchmark Model Comparisons

Simulating Radionuclide Fate and Transport in the Unsaturated Zone: Evaluation and Sensitivity Analyses of Select Computer Models (July 2002)
http://semspub.epa.gov/work/11/176294.pdf
(this is for more sophisticated soil to groundwater models that could be used as site-specific replacements for the PRG and DCC calculator soil to groundwater scenario.)

NCRP Report No. 146: Approaches to Risk Management in Remediation of Radioactively Contaminated Sites (October 2004)
http://ncrponline.org/publications/reports/ncrp-reports-146/
(this report examines EPA Superfund and NRC Decommissioning programs approach to radiation site cleanup. Section 3.3.3 is a "Comparison of EPA Preliminary Remediation Goals with NRC Screening Levels." It is part of a larger Section 3.3 "Methods of Site Characterization and Dose or Risk Assessment.")

U.S. Environmental Protection Agency Cross-Program Coordination on Superfund Radiation Approach

The Superfund program's risk-based approach for radionuclides reflects a long history of ORIA support. Below are excerpts from the *1993 Health Effects Assessment Summary Tables User Guide* (March 1993, EPA 540-R-93-058) discussing radionuclide slope factors (see pages 36):

INTENDED USERS AND APPLICATIONS

HEAST users include individuals from the EPA, other Federal agencies, States and contractors who are responsible for the identification, characterization and remediation of sites contaminated with radioactive materials. Radionuclide slope factors are calculated by EPA's Office of Radiation and Indoor Air (ORIA) to assist HEAST users with risk-related evaluations and decision-making at various stages of the remediation process. During site assessment, for example, slope factors are used in EPA's Hazard Ranking System (HRS) to assign toxicity factor values to radionuclides to calculate site scores. During the remedial investigation and feasibility study (RI/FS), slope factors are used to determine baseline site risk, to develop preliminary remediation goals, and to evaluate cleanup alternatives. For further examples on the application of radionuclide slope factors in risk evaluations, users are referred to the following EPA documents:

- Hazard Ranking System (HRS), *Federal Register* (55 FR 51532D), December 1990.
- *Risk Assessment Guidance for Superfund; Volume I - Human Health Evaluation Manual* (RAGS/HHEM), Part A, Baseline Risk Assessment (EPA/540/1-89/002).
- RAGS/HHEM Part B, Development of Risk-Based Preliminary Remediation Goals (OSWER Directive 9285.7-01B). [NTIS order number: PB 92-963333.]
- RAGS/HHEM Part C, Risk Evaluation of Remedial Alternatives (OSWER Directive 9285.7-01C). [NTIS order number: PB 92-963334.]

The Superfund and radiation programs have worked together on a number of guidance documents pertaining to addressing radioactive contamination at Superfund sites. These

documents have been jointly signed at either the office director level or the assistant administrative level. For example:

1. Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination (August 1997)
   http://semspub.epa.gov/src/document/HQ/176331

2. Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA Sites (February 1998)
   http://semspub.epa.gov/src/document/HQ/175266

3. Radiation Risk Assessment At CERCLA Sites: Q & A (December 1999)
   http://semspub.epa.gov/src/document/HQ/175420

4. Remediation Goals for Radioactively Contaminated CERCLA Sites Using the Benchmark Dose Cleanup Criteria in 10 CFR Part 40 Appendix A, I, Criterion 6(6) (April 2000)
   http://semspub.epa.gov/src/document/HQ/176323

5. Soil Screening Guidance for Radionuclides: User Guide (October 2000)
   http://semspub.epa.gov/src/document/HQ/175428

6. Soil Screening Guidance for Radionuclides: Technical Background Document (October 2000)
   http://semspub.epa.gov/src/document/HQ/175427

7. Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA sites (November 2001)
   http://semspub.epa.gov/src/document/HQ/176295

8. Distribution of OSWER of Radionuclide Preliminary Remediation Goals (PRGs) for Superfund Electronic Calculator (February 2002)
   http://semspub.epa.gov/src/document/HQ/176330

Superfund Remedial Program Coordination with States and Other Organizations on Guidance and Training to Address Radioactive Contamination

EPA's OSRTI staff have worked with the Environmental Council of the States' Interstate Technology and Regulatory Council (ITRC) radiation team on several guidance documents and training classes. ITRC is a public-private coalition working to reduce barriers to the use of innovative environmental technologies that reduce compliance costs and maximize cleanup efficacy. ITRC produces documents and training that broaden and deepen technical knowledge and expedite quality regulatory decision making while protecting human health and the environment. ITRC achieves its mission through its technical teams, which are composed of environmental professionals, including state and federal environmental regulators, federal agency representatives, industry experts, community stakeholders, and academia. ITRC teams are led by state environmental agency staff.

The ITRC documents addressing radiation issues that OSRTI staff helped develop are:

1. Determining Cleanup Goals at Radioactively Contaminated Sites: Case Studies (April 2002)
   http://www.itrcweb.org/GuidanceDocuments/RAD-2.pdf

2. Real-Time Measurement of Radionuclides in Soil: Technology and Case Studies (February 2006)
   http://www.itrcweb.org/GuidanceDocuments/RAD_4Web.pdf

3. Decontamination and Decommissioning of Radiologically Contaminated Facilities (January 2008)
   http://www.itrcweb.org/GuidanceDocuments/RAD5.pdf

4. A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater (December 2010)
   http://www.itrcweb.org/GuidanceDocuments/APMR1.pdf

The ITRC radiation remediation online training course modules listed below contain contributions from Superfund remedial program staff; for some modules, EPA staff delivered the training:

1. Radiation Risk Assessment: Updates and Tools. Module 3, "Use of Radiation PRG Calculator: Explain how to use EPA's new Risk-based PRG- and ARAR Dose-calculators for radionuclides" was presented by an OSRTI staffer. Module 4, "Case Study Application for PRG Calculator: Demonstrate site-specific challenges in application of tools" provides a demonstration of using an OSRTI tool.

https://clu-in.org/conf/itrc/rads_051507/

2. Radiation Site Cleanup: CERCLA Requirements and Guidance. Modules 2 and 3, "EPA CERCLA Radiation Requirements and Guidance: Explain EPA remedy selection policy, in particular those guidance documents and tools that address radioactively contaminated sites" are both presented by OSRTI staff and focus on regulations and guidance developed by OSRTI.
https://clu-in.org/conf/itrc/radscleanup_060507/

3. Decontamination and Decommissioning of Radiologically-Contaminated Facilities. Module 3, "Preliminary Remediation Goal (PRG) Calculators" was presented by EPA staff and focuses on OSRTI risk assessment tools for buildings and streets/sidewalks.
https://clu-in.org/conf/itrc/radsdd_030410/

4. Real-Time Measurement of Radionuclides in Soil.
https://clu-in.org/conf/itrc/radsrealtime_102808/

5. A Decision Framework for Applying Attenuation Processes to Metals and Radionuclides.
https://clu-in.org/conf/itrc/apmr_101311/

U.S. Environmental Protection Agency and Nuclear Regulatory Commission Coordination at Contaminated Sites

In 2002 EPA and the NRC signed a memorandum of understanding (MOU) to identify the two agencies' interactions during NRC-licensed sites' decommissioning and decontamination and the ways in which those interactions occur. Except for Section VI, which addresses corrective action under the Resource Conservation and Recovery Act, this MOU is limited to the coordination between EPA, when acting under CERCLA authority, and NRC, when an NRC-licensed facility is undergoing decommissioning, or when a facility has completed decommissioning, and the NRC has terminated its license. EPA believes that the MOU's implementation will help eliminate confusion about dual regulation during NRC-licensed sites' cleanup and reuse.

The MOU EPA and NRC signed may be found here:
http://semspub.epa.gov/src/document/HQ/176321.

You may also find copies of each of the consultation letters between EPA and NRC for the site where consultation under the MOU has occurred. These letters may be found at this website under the subsection "MOU with NRC":
https://www.epa.gov/superfund/radiation-superfund-sites

Superfund Remedial Program Coordination with Foreign and International Agencies on Solving Issues of Radioactively Contaminated Sites

OSRTI has a good working relationship with foreign countries and organizations. During our 14 annual/bi-annual meetings with regional radiation staff, we have had visitors from agencies in Australia, Canada, France, Iraq, Japan, Norway, Russia, and the United Kingdom, as well as the International Atomic Energy Agency (IAEA). These interactions have led to one EPA regional staff member completing a six-month detail with the United Kingdom Environment Agency to help develop procedures for addressing radioactive contamination. In addition, the interaction has also led to regional staff members participating in IAEA workgroups and providing Japan with information on US cleanups that may help with post-Fukushima remediation efforts. These interactions have also resulted in OSRTI staff participating in IAEA and Organisation (OECD) for Economic Co-operation and Development workgroups and presenting at multiple conferences at the request of IAEA, North Atlantic Treaty Organization and foreign governments.

OSRTI staff also provided extensive input on two recent OECD guidance document development efforts, which included providing significant text describing Superfund's approach to addressing radionuclides.

1. Nuclear Site Remediation and Restoration during Decommissioning of Nuclear Installations
   http://www.oecd-nea.org/rwm/pubs/2014/7192-cpd-report.pdf

2. Strategic Considerations for the Sustainable Remediation of Nuclear Installations
   http://www.oecd-nea.org/rwm/pubs/2016/7290-strategic-considerations.pdf

National Council on Radiation Protection and Measurement Report 146

NRC funded the 2004 NRCP report, No. 146 "Approaches to Risk Management in Remediation of Radioactively Contaminated Sites." The report's purpose and scope is found on page 4 of the report:

Purpose and Scope of Study

The National Council on Radiation Protection and Measurements (NCRP) was asked by NRC to perform an analysis of current regulatory guidance and practice used by NRC and EPA in remediation of radioactively contaminated sites. Specifically tasks were:

- identify and summarize current regulatory guidance and practice on remediation of radioactively contaminated sites used by NRC under the LTR and by EPA under CERCLA and NCP, including a review of models and tools used to assess regulatory compliance;
- identify, examine and summarize the historical basis for current guidance and practices of the two agencies;
- identify, analyze and summarize the significant differences and commonalities in current guidance and practices of the two agencies; and
- identify, examine and summarize the implications of current guidance and practices of the two agencies as they relate to such issues as public perception, uncertainty, measurability, and dose and risk estimates.

The ultimate objective of such an analysis is to evaluate whether guidance and practice of NRC and EPA can be harmonized to provide reasonably consistent approaches to decision making in remediation of radioactively contaminated sites.

EPA and NRC discussed the report during its development and upon its completion, and it has informed subsequent staff discussions about various technical issues. The report was not developed with an expectation that it would lead either agency to revamp its program; further, the report does not include a recommendation for either to do so. We have also reviewed the presentation on the report given by its Chairman Dan Strom to EPA staff at the National Superfund Radiation meeting on February 28, 2007. Below is the slide summarizing the report's conclusions.